

WE CLAIM:

1. A process for removing contaminants from a natural gas feed stream containing water comprising the steps of: cooling the natural gas feed stream in a first vessel to a first operating temperature at which hydrates are formed; and removing from the first vessel a stream of dehydrated gas.
2. The process of claim 1 wherein the natural gas feed stream further comprises sour species, which process further comprises the steps of cooling the dehydrated gas in a second vessel to a second operating temperature at which solids of the sour species are formed or at which the sour species dissolve in a liquid; and removing from the second vessel a stream of dehydrated sweetened gas.
3. The process of claim 1 wherein the natural gas feed stream is introduced into the first vessel at a temperature that is below the first operating temperature.
4. The process of claim 2 wherein the dehydrated gas is introduced into the second vessel at a temperature that is below the second operating temperature.
5. The process of claim 2 wherein the natural gas feed stream is introduced into the first vessel at a temperature that is below the first operating temperature, and the dehydrated gas is introduced into the second vessel at a temperature that is below the second operating temperature.
6. The process of claim 1 wherein the natural gas feed stream and a stream of liquid are introduced into the first vessel at a temperature that is below the first operating temperature to form a slurry with the hydrates.
7. The process of claim 2 wherein the dehydrated gas and a stream of liquid are introduced into the second

vessel at a temperature that is below the second operating temperature to form a slurry or mixture with the sour contaminants.

8. The process of claim 7 wherein the natural gas feed stream is introduced into the first vessel at a temperature that is below the first operating temperature.

9. The process of claim 2 wherein the natural gas feed stream and a stream of liquid is introduced into the first vessel at a temperature that is below the first operating temperature to form a slurry with the hydrates, and the dehydrated gas and a stream of liquid is introduced into the second vessel at a temperature that is below the second operating temperature to form a slurry or mixture with the sour contaminants.

10. The process of claim 6 wherein the liquid is a natural gas liquid.

11. The process of claim 7 wherein the liquid is a natural gas liquid.

12. The process of claim 8 wherein the liquid is a natural gas liquid.

13. The process of claim 9 wherein the liquid is a natural gas liquid.

14. The process of claim 1 further comprising the step of heating the hydrates in the first vessel to a temperature that is above the first operating temperature thereby producing a water-containing liquid.

15. The process of claim 2 further comprising the step of heating the sour species in the second vessel to a temperature that is above the second operating temperature thereby producing a sour species-containing liquid.

16. The process of claim 2 further comprising the steps of heating the hydrates in the first vessel

thereby producing a water-containing liquid and heating the sour species in the second vessel thereby producing a sour species-containing liquid.

17. The process of claim 14 wherein heating the hydrates in the first vessel comprises adding to the hydrates a warm liquid.

18. The process of claim 16 wherein heating the hydrates in the first vessel comprises adding to the hydrates a warm liquid.

19. The process of claim 15 wherein heating the sour species in the second vessel comprises adding to the sour species a warm liquid.

20. The process of claim 16 wherein heating the sour species in the second vessel comprises adding to the sour species a warm liquid.

21. The process of claim 17 wherein the warm liquid is a natural gas liquid.

22. The process of claim 18 wherein the warm liquid is a natural gas liquid.

23. The process of claim 19 wherein the warm liquid is a natural gas liquid.

24. The process of claim 20 wherein the warm liquid is a natural gas liquid.